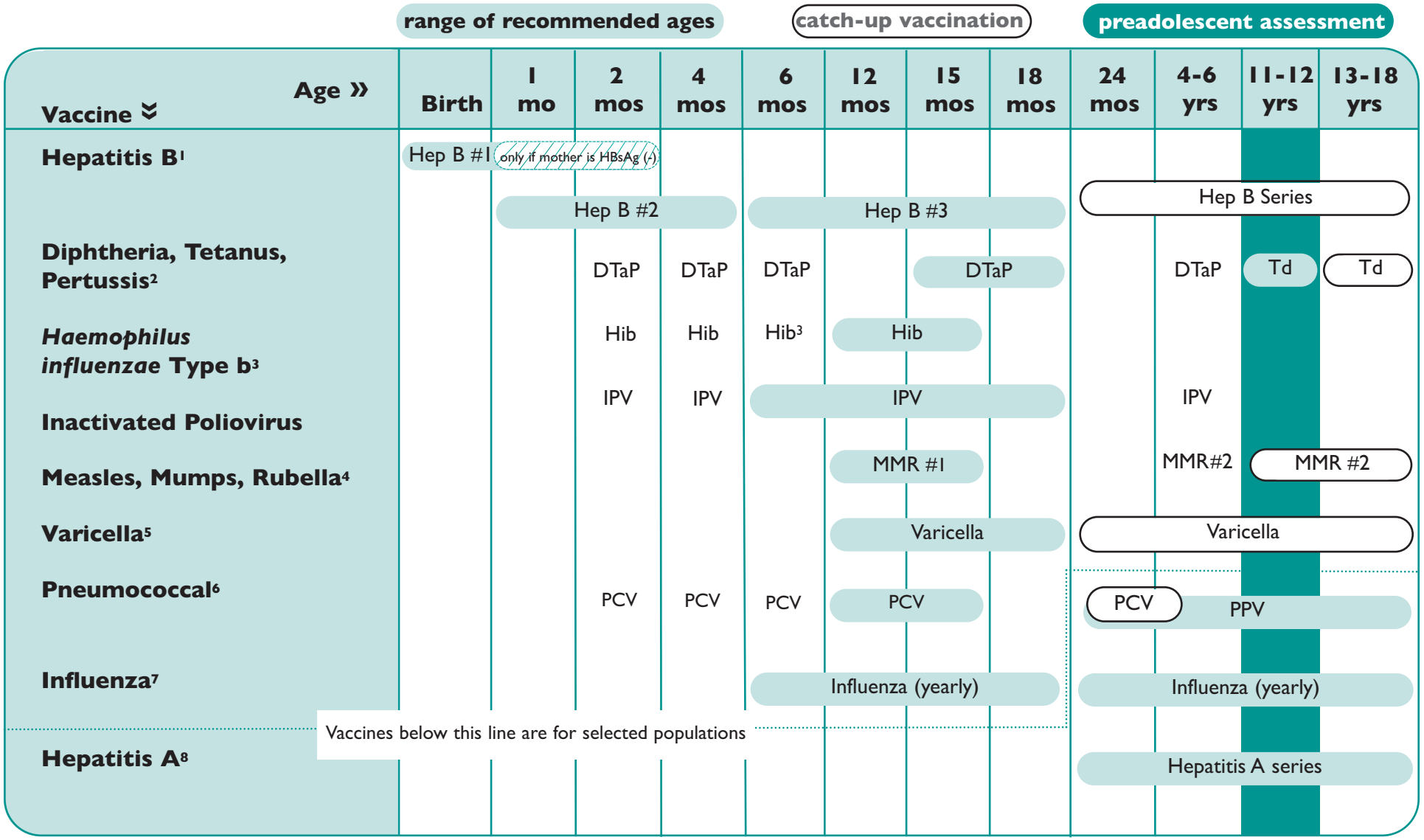
Massachusetts Department of Public Health
Recommended Childhood Immunization Schedule 2004



Any dose not given at the recommended age should be given at any subsequent visit when indicated and feasible. ⬭ Indicates age groups that warrant special effort to administer those vaccines not previously given. Additional vaccines may be licensed and recommended during the year. For minimum intervals, 1 month = 4 weeks = 28 days. Licensed combination vaccines may be used whenever any components of the combination are indicated and the vaccine's other components are not contraindicated. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form can be found on the Internet: http//www.vaers.org/ or by calling 1-800-822-7967.

(Footnotes can be found on page 2)

1. Hepatitis B vaccine (Hep B). All infants should receive the first dose of hepatitis B vaccine soon after birth and before hospital discharge; the first dose may also be given by age 2 months if the infant's mother is hepatitis B surface antigen (HBsAg)-negative. Only monovalent Hep B vaccine can be used for the birth dose. Monovalent or combination vaccine containing Hep B may be used to complete the series. Four doses of vaccine may be administered when a birth dose is given. The second dose should be administered at least 4 weeks after the first dose, except for combination vaccines, which cannot be administered before age 6 weeks. The third dose should be given at least 16 weeks after the first dose and at least 8 weeks after the second dose. The last dose in the vaccination series (third or fourth dose) should not be administered before age 24 weeks.

Infants born to HBsAg-positive mothers should receive Hep B vaccine and 0.5 mL Hepatitis B Immune Globulin (HBIG) within 12 hours of birth at separate sites. The second dose is recommended at age 1 to 2 months. The last dose in the vaccination series should not be administered before age 24 weeks. These infants should be tested for HBsAg and antibody to HBsAg (anti-HBs) at 9 to15 months of age.

Infants born to mothers whose HBsAg status is unknown should receive the first dose of the Hep B vaccine series within 12 hours of birth. Maternal blood should be drawn as soon as possible to determine the mother's HBsAg status; if the HBsAg test is positive, the infant should receive HBIG as soon as possible (no later than age 1 week). The second dose is recommended at age 1 to 2 months. The last dose in the vaccination series should not be administered before age 24 weeks.

2. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP). The fourth dose of DTaP may be administered as early as age 12 months, provided 6 months have elapsed since the third dose and the child is unlikely to return at age 15-18 months. The final dose in the series should be given at age ≥ 4 years. **Tetanus and diphtheria toxoids (Td)** are recommended at age 11 to 12 years if at least 5 years have elapsed since the last dose of tetanus and diphtheria toxoid-containing vaccine. Subsequent routine Td boosters are recommended every 10 years.

3. *Haemophilus influenzae* type b (Hib) conjugate vaccine. Three Hib conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB® or ComVax® [Merck]) is administered at ages 2 and 4 months, a dose at age 6 months is not required. DTaP/Hib combination products should not be used for primary immunization in infants at ages 2, 4 or 6 months, but can be used as boosters following any Hib vaccine. The final dose in the series should be given at age ≥ 12 months.

4. Measles, mumps, and rubella vaccine (MMR). The second dose of MMR is recommended routinely at age 4 to 6 years but may be administered during any visit, provided at least 4 weeks have elapsed since the first dose and that both doses are administered beginning at or after age 12 months. Those who have not previously received the second dose should complete the schedule by the 11- to 12-year-old visit.

5. Varicella vaccine. Varicella vaccine is recommended at any visit at or after age 12 months for susceptible children (i.e. those who lack a reliable history of chickenpox). Susceptible persons age ≥ 13 years should receive 2 doses, given at least 4 weeks apart. Regardless of age, 2 doses with a 12-week minimum interval between doses are now recommended for a few designated groups with immunosuppression.

6. Pneumococcal vaccine. The heptavalent **pneumococcal conjugate vaccine (PCV)** is recommended for all children age 2 to 23 months. It is also recommended for certain children age 24 to 59 months, who are at high risk for infection due to sickle cell disease, asplenia, HIV infection, chronic illness, cochlear implants, or other immunocompromising conditions. **Consider** vaccination with PCV for all other children 24 to 59 months of age, with **priority** given to: 1) children 24 to 35 months of age; 2) children who are Native American/Alaskan Native, or black; and 3) children who attend group child care. The final dose in the series should be given at age ≥ 12 months.

Pneumococcal polysaccharide vaccine (PPV) is recommended in addition to PCV for certain high-risk groups, including those with cochlear implants. See *MMWR* 2000;49(RR-9):1-38. PPV23 should be given at ≥ 2 years of age and at least 2 months after the last dose of PCV. Give a second dose **once** to children at highest risk of serious pneumococcal infection, as defined by the ACIP: for those ≤ 10 years of age, give at least 3 years from the first dose; for those > 10 years, give at least 5 years from the first dose. For additional information, please refer to the table, **Vaccination with PPV23 for High-Risk Children Who Have Received PCV7**, on page 5.

7. Influenza vaccine. Influenza vaccine is recommended annually for children age ≥ 6 months with certain risk factors (including but not limited to children with asthma, cardiac disease, sickle cell disease, human immunodeficiency virus infection, diabetes, and close contacts [including household members] of persons in groups at high risk, see *MMWR* 2003;52[RR-8]:1-96), and can be administered to all others wishing to obtain immunity. Beginning in the fall of 2004, healthy children age 6-23 months and close contacts of healthy children age 0-23 months are recommended to receive influenza vaccine, because children in this age group are at substantially increased risk for influenza-related hospitalizations. For healthy persons age 5 to 49 years, the intranasally administered live-attenuated influenza vaccine (LAIV) is an acceptable alternative to the intramuscular trivalent inactivated influenza vaccine (TIV). See *MMWR* 2003;52(RR-13):1-8. Children receiving TIV should be administered a dosage appropriate for their age (0.25 mL if age 6 to 35 months or 0.5 mL if age ≥ 3 years). Children age ≤ 8 years who are receiving influenza vaccine for the first time should receive 2 doses (separated by at least 4 weeks for TIV and at least 6 weeks for LAIV).

8. Hepatitis A vaccine. Hepatitis A vaccine is not recommended for routine immunization in Massachusetts, where disease incidence is very low. However, it should be given to children ≥ 2 years of age in those groups at risk for infection as defined by the ACIP. A booster should be given at least 6 months after the initial dose. See *MMWR* 1999;48(RR-12):1-37.

The *Childhood Immunization Schedule* is based on the recommendations of the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP).

Massachusetts School Immunization Requirements 2004

Minimum Immunization Requirements For School Entry In 2004 School Year*					
	Child Care/Preschool[1]	**Kindergarten**	**Grades 1-6**	**Grades 7-12**	**College[2]**
Hepatitis B[3]	3 doses	3 doses	3 doses	3 doses	3 doses for all health science students and all full-time undergraduates
DTaP/DTP/ DT/Td[4]	≥ 4 doses DTaP/DTP	5 doses DTaP/DTP	≥ 4 doses DTaP/DTP or ≥ 3 doses Td	4 doses DTaP/DTP or ≥ 3 doses Td; *plus* 1 Td booster	1 Td booster within last 10 years
Polio[5]	≥ 3 doses	4 doses	≥ 3 doses	≥ 3 doses	—
Hib[6]	1 to 4 doses[6]	—	—	—	—
MMR[7]	1 dose	2 doses measles, 1 mumps, 1 rubella	2 doses measles, 1 mumps, 1 rubella	2 doses measles, 1 mumps, 1 rubella	2 doses measles, 1 mumps, 1 rubella
Varicella[8]	1 dose	1 dose	1 dose (grades 1-5 only)	< 13 yrs. - 1 dose ≥ 13 yrs. - 2 doses	—

* These requirements also apply to **all** new "enterers".

[1]Child Care/Preschool: Minimum requirements by 24 months; younger children should be immunized according to schedule for their age.

[2]College: Requirements apply to 1) all full-time undergraduate and graduate students; 2) all full-time and part-time health science students; and 3) any full-time or part-time student attending any post-secondary institution while on a student or other visa, including foreign students attending or visiting classes as part of a formal academic visitation or exchange program.

[3]Hepatitis B: 3 doses are required for child care, preschool, and kindergarten - 12th grade attendance for children. **Beginning in September 2004, 3 doses are now required for full-time seniors attending college.** It is also required for all full-time freshmen, sophomores and juniors as well as all health science students (both full-time and part-time, undergraduate and graduate) attending college. Laboratory proof of immunity is acceptable. Please refer to the **Phase In Schedule.**

[4]DTaP/DTP/DT/Td: 5 doses of DTaP/DTP are required for school entry unless the fourth dose is given on or after the 4th birthday. DT is only acceptable when accompanied by a letter stating a medical contraindication to DTaP/DTP. A **single** booster dose of Td is required for all students entering grades 7-12 (It is not required if it has been < 5 years since their last dose of DTaP/DTP/DT.)

[5]Polio: 4 doses are required for school entry, unless the third dose of an all-IPV or all-OPV schedule is given on or after the 4th birthday, in which case only 3 doses are needed. However, if the sequential or a mixed IPV/OPV schedule was used, 4 doses are always required to complete the primary series.

[6]Hib: The number of primary doses is determined by vaccine product and age the series begins.

[7]MMR: 1 dose is required for entry into child care and preschool. A second dose of measles vaccine, given at least 4 weeks after the first, is required for entry to all grades K-12, and college. Laboratory proof of immunity is acceptable.

[8]Varicella: 1 dose is required for child care attendance at centers licensed by Office of Child Care Services (OCCS) for all children born on or after January 1, 1997, **and** who are ≥ 19 months of age, **and** who are without a physician-certified reliable history of chickenpox. 1 dose is also required for all susceptible students at entry to preschool, kindergarten-5th grade, and grades 7-12. If the child is ≥ 13 years of age, 2 doses are required.

A reliable history of chickenpox is defined as: 1) physician interpretation of parent/guardian description of chickenpox; 2) physician diagnosis of chickenpox; or 3) laboratory proof of immunity. Please refer to the **Phase In Schedule** below.

Phase In Schedule 2004-2005 For Hepatitis B, Td, and Varicella Vaccines		
	2004	**2005**
3 Hep B	K-12 College: All health science; freshmen-seniors	K-12 College: All health science; freshmen - graduate
Td	7-12	7-12
Varicella	Child Care/Preschool, K-5 and 7-12	Child Care/Preschool, K-12

For Children Who Start Late, Who Are > 1 Month Behind, or Who Need an Accelerated Schedule

This schedule can be used for children needing a "catch-up" schedule, for children needing an accelerated schedule, or to determine minimum intervals between doses for children who have delayed immunizations. There are **no** maximum intervals; there is **no** need to restart a vaccine series, regardless of the time that has elapsed between doses. Use the chart appropriate for the child's age.

Table 1. Catch-up schedule for children age 4 months through 6 years

	Minimum Interval Between Doses				
	Minimum Age for Dose One	Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
DTaP[1]	6 weeks	**4 weeks**	**4 weeks**	**6 months**	**6 months**
IPV[2]	6 weeks	**4 weeks**	**4 weeks**	**4 weeks**	
Hep B[3]	birth	**4 weeks**	**8 weeks** (and 16 weeks after 1st dose)		
MMR[4]	12 months	**4 weeks**			
Varicella[5]	12 months				
Hib[6]	6 weeks	**4 weeks:** if 1st dose given at age < 12 months **8 weeks (as final dose)**: if 1st dose given at age 12-14 months **No further doses needed:** if 1st dose given at age ≥ 15 months	**4 weeks:** if current age is < 12 months **8 weeks (as final dose):** if current age is ≥ 12 months and 2nd dose given at age < 15 months **No further doses needed:** if previous dose given at age ≥ 15 months	**8 weeks (as final dose):** this dose is only necessary for children age 12 months – 5 years who received 3 doses before age 12 months	
PCV[7]	6 weeks	**4 weeks:** if 1st dose given at age < 12 months and current age is < 24 months **8 weeks (as final dose):** if 1st dose given at age ≥ 12 months or current age is 24 – 59 months **No further doses needed:** for healthy children if 1st dose given at age ≥ 24 months	**4 weeks:** if current age is < 12 months **8 weeks (as final dose):** if current age is ≥ 12 months **No further doses needed:** for healthy children if previous dose given at age ≥ 24 months	**8 weeks (as final dose):** this dose is only necessary for children age 12 months – 5 years who received 3 doses before age 12 months	

Table 2. Catch-up schedule for children age 7 through 18 years

	Minimum Interval Between Doses		
	Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Booster Dose
Td[8]	**4 weeks**	**6 months**	**6 months:** if 1st dose given at age < 12 months and current age is < 11 years **5 years:** if 1st dose given at age ≥ 12 months and 3rd dose given at age < 7 years and current age is ≥ 11 years **10 years:** if 3rd dose given at age ≥ 7 years
IPV[2]	**4 weeks**	**4 weeks** (8 weeks preferred)	**4 weeks** (6 months preferred)
Hep B[3]	**4 weeks**	**8 weeks** (and 16 weeks after 1st dose)	
MMR[4]	**4 weeks**		
Varicella[5]	**4 weeks**		

1. DTaP: The fifth dose is not necessary if the fourth dose was given on or after the 4th birthday. If there is no history of DTaP/DTP/DT, the first dose of Td may be given as early as 7 years of age, but should be considered invalid if given before the 7th birthday.

2. IPV: Polio vaccine is not recommended for individuals ≥ 18 years unless there is potential for exposure. The fourth dose is not necessary in an all-IPV or all-OPV schedule if the third dose was given on or after the 4th birthday. If both OPV and IPV were given as part of the series, a total of 4 doses should be given, regardless of the child's current age. If an unimmunized or partially-immunized child will be traveling to polio endemic or epidemic countries, follow an accelerated all-IPV schedule to complete as much of their series as possible prior to departure:

* If ≥ 8 weeks are available, administer 3 doses, 4 weeks apart;
* If 4-7 weeks are available, administer 2 doses, 4 weeks apart;
* If < 4 weeks are available, administer 1 dose.

3. Hep B: All children and adolescents who have not been immunized against hepatitis B should begin the hepatitis B vaccination series during any visit. Providers should make special efforts to immunize children who were born in, or whose parents were born in, areas of the world where hepatitis B infection is moderately or highly endemic.

4. MMR: Do not administer MMR vaccine before 12 months of age. The second dose of MMR is recommended routinely at age 4-6 years, but may be given earlier if desired.

5. Varicella: Do not administer varicella vaccine before 12 months of age. Give 2-dose series to all susceptible adolescents ≥ 13 years of age.

6. Hib: The number of primary doses is determined by the age of the child and the number of doses previously received. Hib vaccine is not generally recommended for children ≥ 5 years. However, it is recommended for children ≥ 5 years of age if they are in certain high-risk groups. For additional information, please refer to the table, **Hib Vaccine Recommendations for Children Not Up-To-Date,** on page 5.

7. PCV7: The number of primary doses is determined by the age of the child and the number of doses previously received. This vaccine is not generally recommended for children ≥ 5 years. For additional information, please refer to the table, **PCV7 Recommendations for Children Not Up-To-Date,** on page 5.

8. Td: For children age 7-10 years, the interval between the third and booster dose is determined by the age when the first dose of tetanus/diphtheria-containing vaccine was given. For adolescents age 11-18 years, the interval is determined by the age when the third dose of tetanus/diphtheria-containing vaccine was given.

Hib Vaccine Recommendations for Children Not Up-To-Date

Age at Presentation	Previous Vaccination History	Recommended Regimen
7-11 months	0 doses	3 doses given with a 1 month minimum interval between dose 1 and 2; third dose given at least 2 months after dose 2, at 12-15 months
	1 dose of HbOC, PRP-T, or PRP-OMP[1]	1 or 2 doses of conjugate vaccine at 7-11 months (depending on age) with a booster dose given at least 2 months later, at 12-15 months
	2 doses of HbOC or PRP-T	1 dose of conjugate vaccine at 7-11 months with a booster dose given at least 2 months later, at 12-15 months of age
12-14 months	0 doses	2 doses of any conjugate vaccine, with a minimum interval of 2 months[2, 3]
	1 dose before 12 months of HbOC, PRP-T or PRP- OMP[1]	2 additional doses of any conjugate vaccine, with a minimum interval of 2 months[2, 3]
	2 doses before 12 months of HbOC, PRP-T, or PRP- OMP[1]	1 dose of any conjugate vaccine[2, 3]
15-59 months	Any incomplete schedule	1 dose of any conjugate vaccine[2, 3]
≥ 60 months	Any incomplete schedule	1 or 2 doses of any conjugate vaccine[2, 4]

[1]HbOC (HIBTITER), PRP-T (ActHIB, OmniHIB), PRP-OMP (PedvaxHIB).

[2]After 12 months of age, PRP-D (ProHIBit) may also be used (in addition to formulations in footnote 1).

[3]For children 12-59 months of age with an underlying condition predisposing them to Hib disease (e.g., sickle cell disease, asplenia, HIV infection, AIDS, other immunosuppressive conditions and treatments) who are not immunized or who have received only 1 dose of conjugate vaccine before age 12 months, 2 additional doses of licensed conjugate vaccine (separated by 2 months) are recommended. If they have received 2 doses before age 12 months, only 1 dose is recommended.
Note: Some experts recommend that a reinforcing dose of Hib vaccine should be given to children undergoing treatment for malignancy, to be administered 3 months after completion of treatment.

[4]Children ≥ 60 months of age with an underlying condition predisposing them to Hib disease (e.g., sickle cell disease, asplenia, HIV infection, AIDS, other immunosuppressive conditions and treatments), who are not completely immunized, should receive 1 dose of Hib vaccine. Some experts recommend 2 doses (separated by 1-2 months) for those with HIV infection or IgG2 deficiency.

PCV7 Recommendations for Children Not Up-To-Date

Age at Examination	Previous Vaccination History	Recommended Regimen[1]
7-11 months	0 doses	2 doses 2 months apart, 3rd dose at 12-15 months
	1 or 2 doses before age 7 months	1 dose at 7-11 months, with another dose at 12-15 months (≥ 2 months later)
12-23 months	0 doses	2 doses ≥ 2 months apart
	1 dose before age 12 months	2 doses ≥ 2 months apart
	1 dose at ≥ 12 months	1 dose ≥ 2 months after the most recent dose
	2 doses before age 12 months	1 dose ≥ 2 months after the most recent dose
24-59 months		
•healthy children[2]	Any incomplete schedule	Consider 1 dose ≥ 2 months after the most recent dose
	<3 doses	1 dose ≥ 2 months after the most recent dose and another dose ≥ 2 months later
•high risk[3]	3 doses	1 dose ≥ 2 months after the most recent dose

[1] For children vaccinated at age <1 year, the minimum interval between doses is 4 weeks. Doses administered at ≥ 12 months should be at least 8 weeks apart.

[2] Providers should consider 1 dose for healthy children age 24-59 months, with priority to children age 24-35 months, American Indian/Alaska Native and black children, and those who attend group child care centers.

[3] Children with sickle cell disease, asplenia, HIV infecion, chronic illness, cochlear implant, or immunocompromising condition.

Vaccination With PPV23 for High-Risk Children Who Have Received PCV7

Population	Schedule for follow-up with PPV23 for children ≥ 2 years of age	Revaccinate with PPV23?
Healthy Children	None[1]	No
Chronic Illness (including cochlear implant)	1 dose PPV23 given at age ≥ 2 years and ≥ 8 weeks after the last dose of PCV7	Not recommended
Children with sickle cell disease, or anatomic or functional asplenia; immunocompromised; HIV-infected	1 dose PPV23 given at age ≥ 2 years and ≥ 8 weeks after the last dose of PCV7	Yes[2]

[1] Health care providers of Alaskan Natives and American Indians may wish to consider whether Native American children would benefit by the additional coverage provided by the expanded serotypes in PPV23.

[2] If the patient is age ≤ 10 years: consider revaccination 3-5 years after previous dose. If the patient is age > 10 years: single revaccination ≥ 5 years after the previous dose.

Immunization Best Practices

1. Assess at every visit.

Review immunization status and administer **all** immunizations due at **all** types of visits (e.g., acute care, follow-up, and well-child visits).

2. Schedule optimally.

Until appropriate combination vaccines are readily available, optimal scheduling in the first year of life is important.

- Hepatitis B: Give first dose at birth, second dose at 1 month of age, and third dose any time between 6-18 months of age. If mother is HBsAg-positive, third dose must be given at 6 months of age.
- IPV: Give third dose any time between 6-18 months of age. (Remember IPV can also be given SC in the upper arm.)

Always schedule immunizations prior to the maximum ACIP-recommended age to ensure that children have received all of the recommended antigens by age 24 months.

3. Adhere to correct intervals and ages.

(a) Minimum intervals:

- Do **not** give vaccines before the recommended minimum age or interval for that antigen.
- Decreasing the minimum age or interval between doses may interfere with antibody response and protection.
- Doses administered before the minimum age and/or minimum interval should be considered invalid and should not be included in determining the previous number of doses given.
- If an invalid dose has been given, count from the last (invalid) dose in order to determine when to give the next **valid** dose.

(b) Maximum intervals:

- There are no maximum intervals; it is **not** necessary to restart the series of any vaccine due to extended intervals between doses.

4. Follow only true contraindications.

Children who present with a mild acute illness, with or without fever, should **not** be deferred for vaccination. Follow only true contraindications as outlined by the ACIP.

5. Use VISs.

Provide patient, parent or legal representative with a copy of the Vaccine Information Statement (VIS) with **each** dose of vaccine administered, and answer any questions regarding risks and benefits of vaccines. Many other resources are available to help address questions about vaccine safety (see box below).

6. Give all vaccines due.

There are **no** contraindications to simultaneous administration of any of the recommended childhood vaccines.

7. Document.

- Proper documentation consists of day, month and year an antigen was given, including the first dose of hepatitis B vaccine, i.e. "at birth" is not acceptable documentation. (Documentation of chickenpox disease should be included on the immunization record.)
- Document in the patient's chart the date a patient moves or goes elsewhere for care (MOGE).
- Document contraindications to vaccines.
- Document parent refusal of vaccines or deferral of any vaccine to a later date.
- Provide the patient or parent/legal representative with an immunization card documenting the vaccines given and the date the next doses are due.

8. Carry out reminder/recall.

- Identify children who are due or overdue for immunizations (e.g., computer billing system, other electronic tracking systems, tickler system, stickers on charts).
- Send out reminder or recall notices **at least twice a year** (e.g., at 8 and 20 months of age).
- Verify patient's address and telephone number at each encounter; obtain a second contact number for back-up.

9. Develop a systematic approach.

- Formally designate one staff member as an "Immunization Champion" to coordinate and monitor all immunization activities, including disseminating immunization schedules, advisories, and communicating current practices and policies to all staff.
- All providers at a practice should formally agree to adhere to a common immunization schedule (based on ACIP guidelines).
- Post agreed upon common schedule throughout the practice.

10. Follow appropriate procedures for vaccine storage and handling.

- Consult the MDPH document *Vaccine Management Requirements* for detailed instructions on proper vaccine storage and handling.
- Maintain up-to-date, written protocols for vaccine storage and handling procedures and share with all staff who handle vaccine.

11. Vaccinate staff.

All personnel who have contact with patients should be appropriately vaccinated.

12. Report adverse events.

Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting system (VAERS). Guidance about how to obtain and complete a VAERS form can be found on the Internet: http//www.vaers.org/ or by calling 1-800-822-7967.

13. Report cases.

Report suspect cases of vaccine-preventable diseases to your local board of health and to the Massachusetts Immunization Program, 617-983-6800 or toll free 888-658-2850.

Adapted from: National Vaccine Advisory Committee. *Standards for Child and Adolescent Immunization Practices*. Pediatrics 2003; 112:958-963.

Resources:

National Immunization Information Hotline: 1-800-232-2522 (English), 1-800-232-0233 (Spanish), and 1-800-243-7889 (TTY)
National Immunization Program: www.cdc.gov/nip. **Immunization Action Coalition**: www.immunize.org
American Academy of Pediatrics: www.aap.org. **Children's Hospital of Philadelphia Vaccine Education Center**: www. chop.edu